



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35
Affiliated to Dr MGR Medical University, Chennai



DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE
TECHNOLOGY

COURSE NAME: PATHOLOGY II

II YEAR

UNIT III : PATHOLOGY OF KIDNEY

TOPIC 4 : RENAL CALCULI



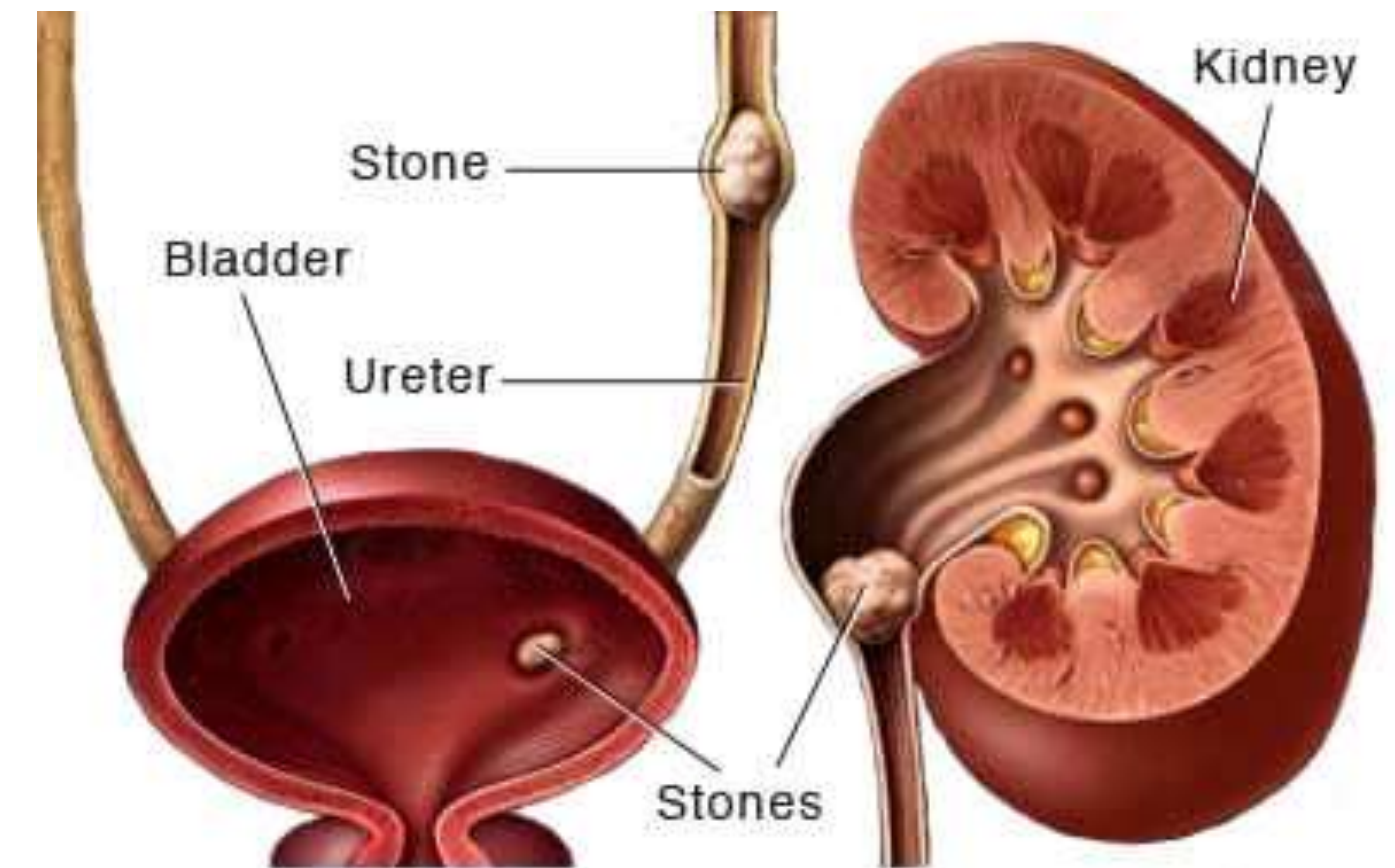
Definition



- Kidney Stones are small, hard ***deposits of mineral and acid salts*** on the inner surfaces of the kidneys

Alternative names include:

- Renal Lithiasis
 - Renal Calculi
 - Nephrolithiasis (Kidney Stone Disease)
-
- Stones are classified by their location in the urinary system and their composition of crystals.



© MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH. ALL RIGHTS RESERVED.



Statistics



Incidence Rate:

- More than 1 million cases annually in US
- 1 in 272 or 3.6 per 1000 people develop stones annually.
- 80% of stones under 2mm in size
- 90% of stones pass through the urinary system spontaneously
- Generally stone smaller than 6mm are passable





Causes of Kidney Stone Formation



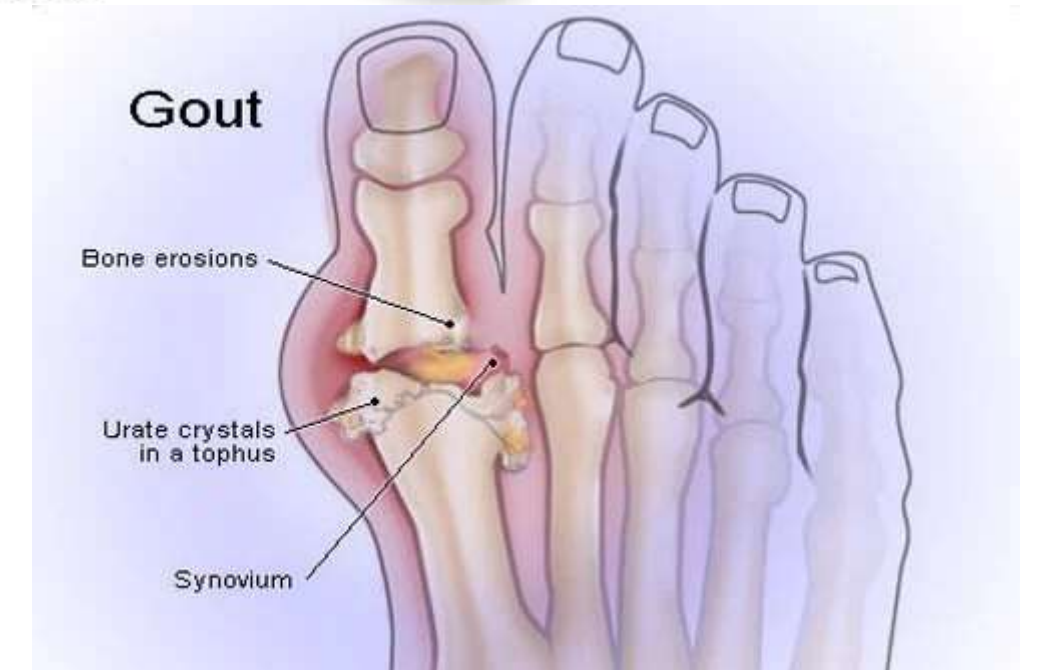
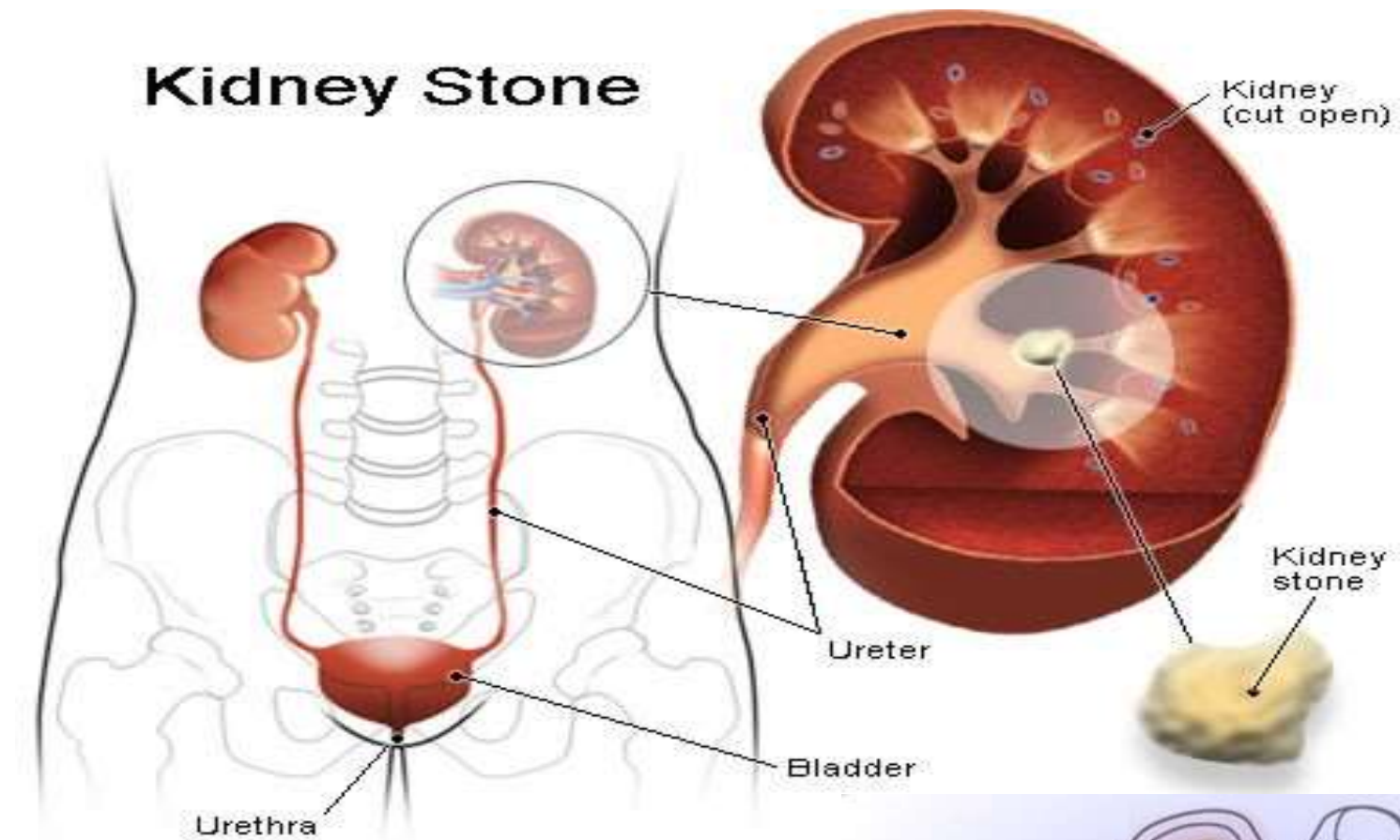
- Highly concentrated urine, urine stasis
- Imbalance of pH in urine

Acidic: Uric and Crystine Stones

Alkaline: Calcium Stones

Gout

- Hyperparathyroidism
- Inflammatory Bowel Disease
- UTI





Types of Stones



- **Calcium Oxalate** - Most common
- **Calcium Phosphate**
- **Struvite**
 - More common in woman than men.
 - Commonly a result of UTI.
- **Uric Acid** - Caused by high protein diet and gout.
- **Cystine**
 - Fairly uncommon; generally linked to a hereditary disorder.





Signs and Symptoms



- *What are the **key findings?***

- Severe flank pain
- Abdominal pain
- Nausea and vomiting
- Fatigue
- Elevated temperature, BP, and respirations
- Steady Pain
- Left flank tenderness

- Additional **S/S:**

- Presence of UTI
- Fever or Chills
- Pain in groin, labia or testicles
- Cloudy or foul-smelling urine
- Dysuria
- Persistent urge to void



Additional Information from patient



- Family history
- Current medications
- Frequency of urination
- Do you experience pain while urinating?
- What is your typical diet?
- How did patient's kidney stones resolve themselves in the past?





Risk Factors



What are *risk factors*?

- Past Medical History - Hx of 3 kidney stone attacks
- Dehydration/Lack of Fluids
- Weather/Climate - Hot, dry



Additional risk factors:

Family or Personal Hx

Gender (male)

Age (20-55)

Diet

- High sodium
- High protein
- Vit A/D, grapefruit juice

Sedentary Lifestyle

Obesity

High Blood Pressure



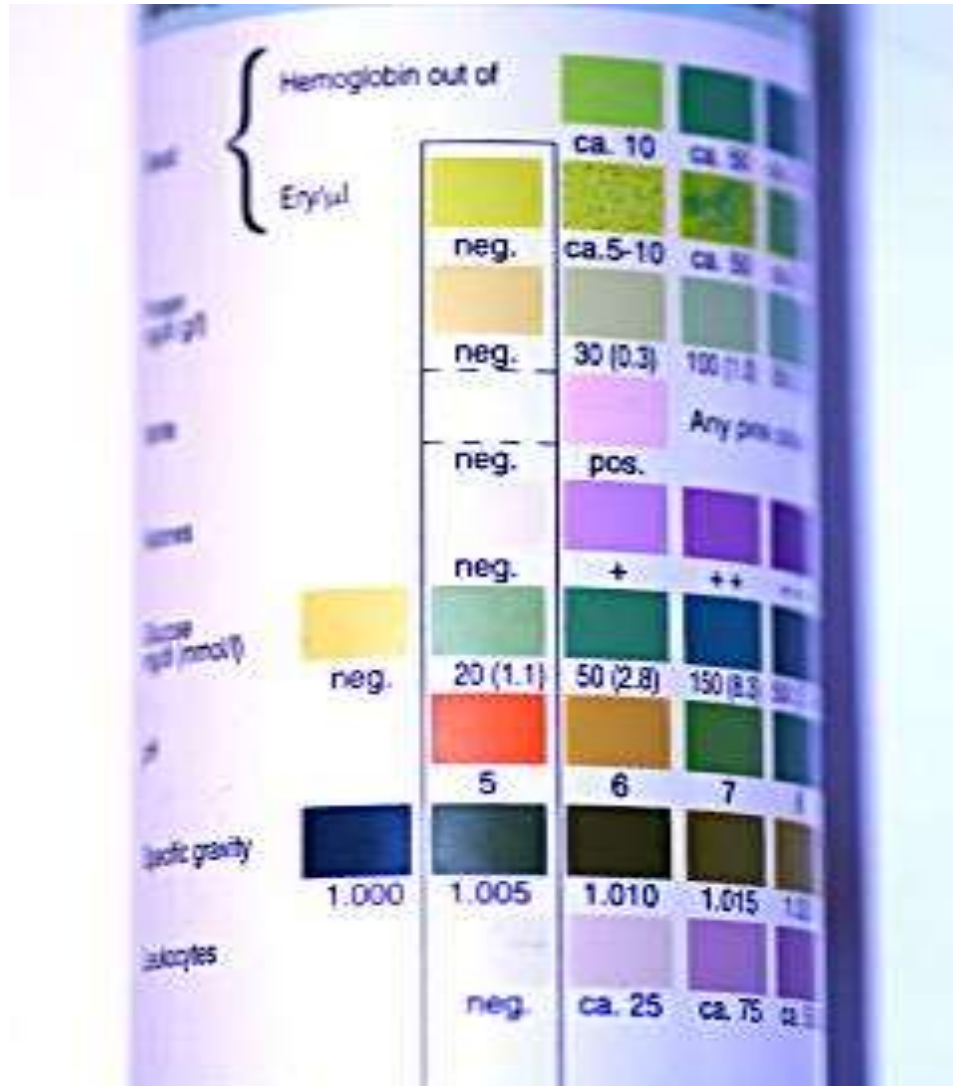
Abnormal Lab Values



BUN

Creatinine

Urine Analysis



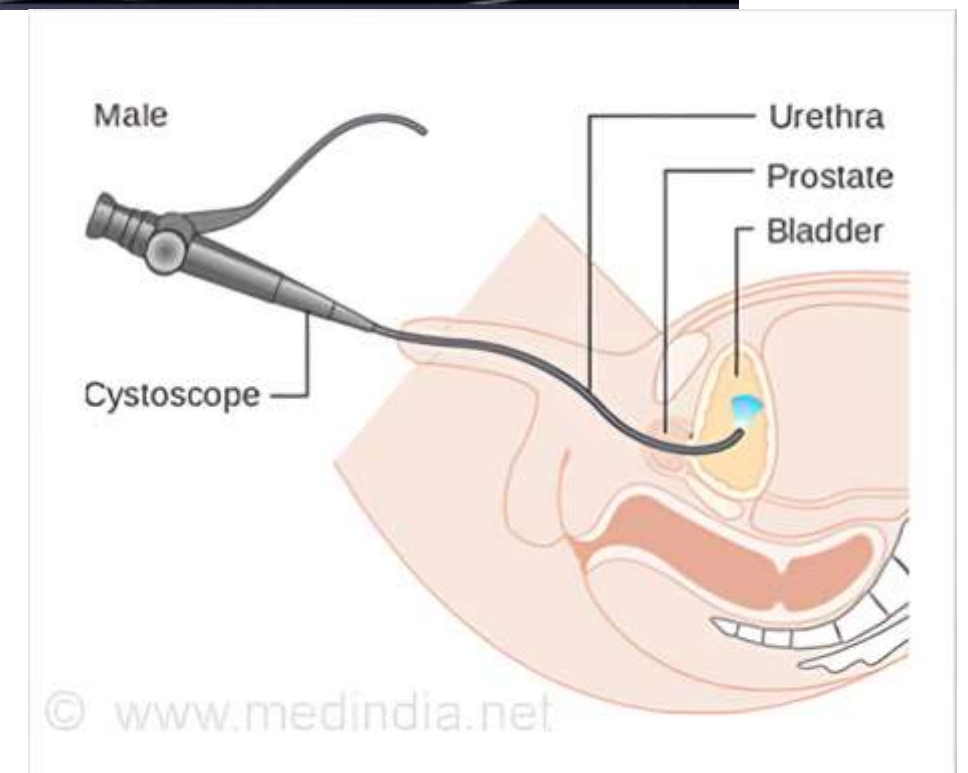
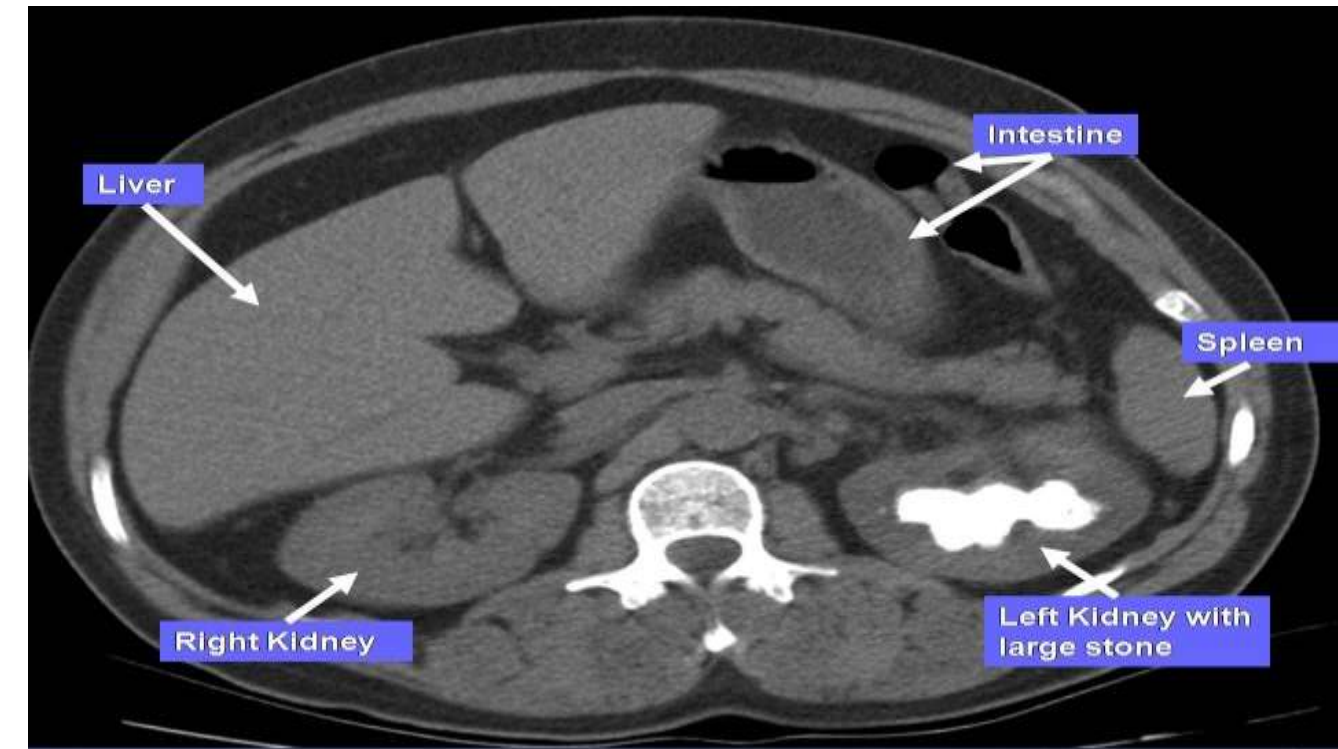


Diagnostic Studies



Test and Diagnostics:

- Blood Analysis
- Urine Analysis
- CT Scan
- Abdominal x-ray
- Ultrasound
- Retrograde Pyelogram
- Cystoscopy
- Intravenous pyelography





Treatment



Two Focuses of Treatment:

- Treatment of acute problems, such as pain etc.,
 - Identify cause and prevent kidney stones from reoccurring
-
- Acute Treatment:
 - Pain Medication!!!
 - Strain urine for stones
 - Keep Hydrated
 - Ambulation
 - Diet Restrictions
 - Emotional Support
 - Invasive Procedure (may be necessary)





Surgical Procedures

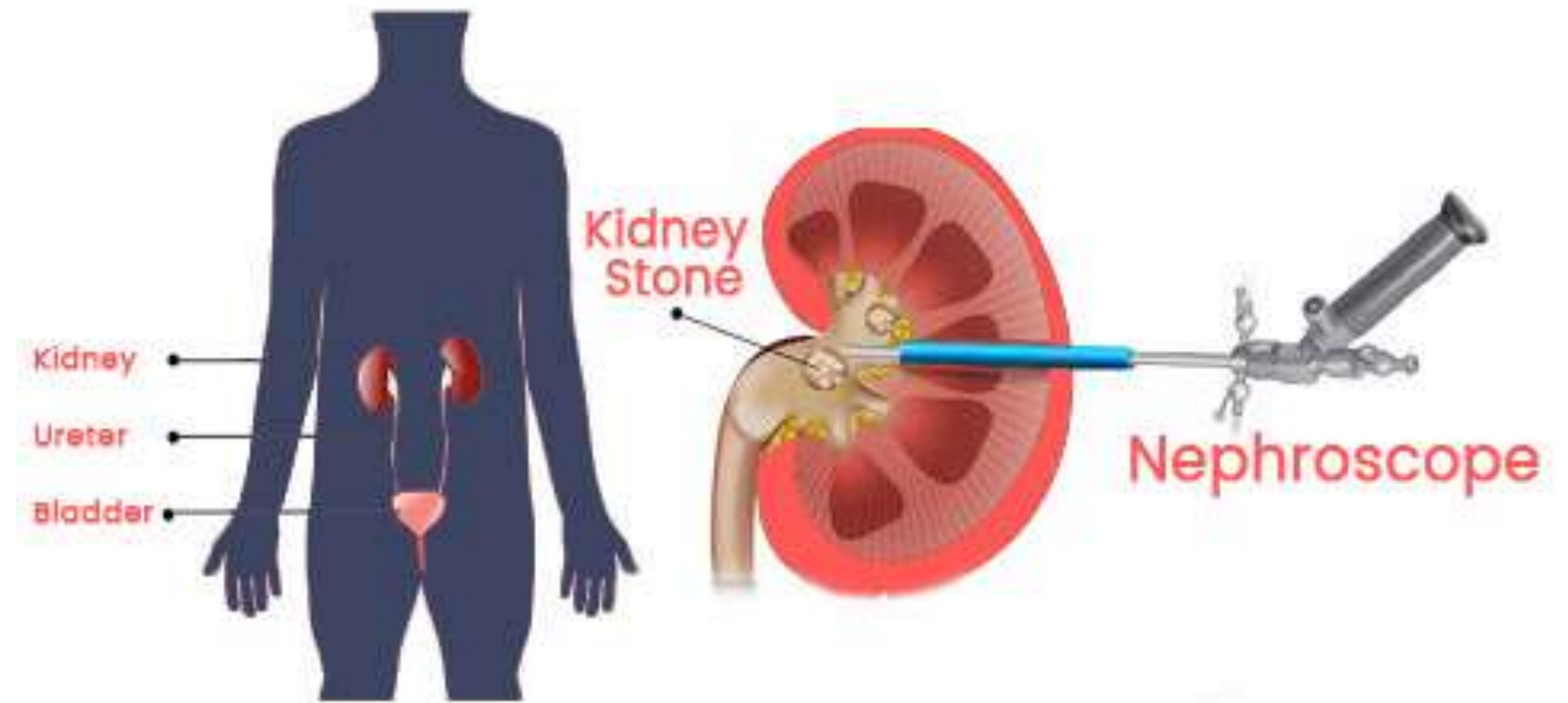


Lithotripsy: used to break into smaller fragments allowing it to pass through the urinary tract.

- Extracorporeal Shock-Wave (ESWL)
- Percutaneous Ultrasonic
- Electrohydraulic
- Laser

Surgical Therapy

- Nephrolithotomy (Kidney)
- Pyelolithotomy (Renal Pelvis)
- Ureterolithotomy (Ureter)





Prevention



- Patient Education
 - Hydration
 - Drink 3 liters of fluid per day (14 cups)
 - Water
 - Lemonade (citrate decrease stone formation)
 - Diet
 - Low sodium
 - Watch amounts of oxalate
 - Low protein
 - Exercise/Increase Activity
- Medication





- *Renal Disease: A Manual of Patient Care* by Lynn Wenig Kagan, RN, PhD
- *Differential Diagnosis: Renal and Electrolyte Disorders* by Saulo Klahr, MD
- MedLine Plus
 - www.nlm.nih.gov/medlineplus/kidneystones.html

THANK YOU